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DESCRIPTIVE ACCOUNT

OF

CAPTAIN BEDFORD PIM'S PROJECT

FOR AN

INTERNATIONAL ATLANTIC AND PACIFIC JUNCTION RAILWAY

ACROSS NICARAGUA.

REPORT AND ESTIMATE OF COST.

BY JOHN COLLINSON, C.E.

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INTERNATIONAL ATLANTIC AND PACIFIC RAILWAY.

INTRODUCTION.

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The question of transit has occupied the attention of men of genius and enterprise from a very early period of the world's history. Pharaoh Necho and Lieutenant Waghorn, R.N., in the Old World: Columbus and Stephens in the New: Frobisher and Franklin at the North Pole: Vasco de Gama and Magellans towards the south: all stand out in bold relief as having devoted themselves to the task of developing transit; but it was reserved for the nineteenth century to see the barriers dividing the east from the west, in both the Old and New World, really broken down.

The overland route to India is an accomplished fact, and the vast benefits it has already conferred on the Anglo-Saxon race can scarcely be enumerated. Now, however, that the route is completed, how little thought is given to the mental and physical toil which was devoted to its successful establishment! But if we reflect on the consequences of a month's, a week's, even a day's suspension of the traffic, we shall arrive at a just measure of its value.

I shall have to deal here with the New World Isthmus, and I may remark that it is hardly possible to conceive anything more widely different than the nature of the link joining Asia and Africa, and that connecting North and South America. In the former, we have a broad, flat, low expanse of parched and arid country, rather more than seventy miles across—a complete desert; in the latter, a mountainous surface and very irregular coast-line, extending over many hundreds of miles, teeming with animal and vegetable life, and narrowest part only about half the width of the Old World Isth There is another striking dissimilarity,—the one possessing earliest records of the human race in readable hieroglyphics, crowded with historical associations of the deepest interest to kind, whilst the other is a comparatively modern addition to history of the world, with its aboriginal writings, still an enig science.

The great isthmus which unites in one vast continent Nor and Southern America is about one thousand three hundred and miles from end to end; its direction is N.W. and S.E., and its more or less, three hundred thousand square miles, about the Great Britain and France put together.

Intersecting this large expanse, there are several necks of which narrow the distance from ocean to ocean, and, at first seem well adapted for transit; but, nevertheless, all the pla crossing at these points, whether by railway or canal, have abandoned, save and except at Panama and Nicaragua.

At the former a railway has been constructed in spite of difficulty; and at the latter a transit has been effected by draught steamers on the River San Juan and Lake Nicarag which, after being the favourite route for years, is now brou a comparative standstill by the silting up of the river and por

Both these enterprises have enjoyed a very large share of favour, at one time dividing the traffic, in spite of the dela hardships incidental to an exceptionally difficult river navigati

With a railway through Nicaragua these delays and har will be avoided; and, considering the saving of time and ex it is not difficult to foretell its future prosperity.

BEDFORD PI

United Service Club,
London, September, 1866.

PANAMA.

Isthmus of Panama lies between the fourth and tenth parallels latitude, and the seventy-seventh and eighty-third meridians of ngitude; it belongs politically to the Republic of New Gra- now called the United States of Columbia. Its least breadth sea to sea is twenty-seven miles, and its configuration is that bow, the coast of the Caribbean Sea forming the convex side, hat of the Pacific the concave. It is clothed with dense tropical ation, an impenetrable forest, and during the wet season is de- with rains.

e less said of the climate and people the better; the former can- e called a desirable one to live in, and the latter, with some ing exceptions, is largely made up of negroes, whose extor- e insolence, depravity, and laziness, are notorious and most de- ble; but the proud boast of Panama is its railroad, and I will give some description of the rise and progress of that really work.

hen the Spanish American Colonies threw off the yoke of Spain, t forty-five years ago, every one was anxious to have a finger in golden pie which was at last open to the world, and it is not prising that all sorts of plans and proposals for joining the two ans were propounded; nothing, however, was really done until 48.

In this year three American merchants, Messrs. Stephens, Aspin- ll, and Chauncey, turned their attention to the Isthmus of Panama, th a view to constructing a railway across it. The first of these ntlemen, well known for his writings on Central America, devoted imself to a preliminary exploration, and proved the feasibility of the project. Having satisfied himself of this fact, he entered into a formal contract with the Government of New Granada, for the exclusive privilege of constructing a railway across the Isthmus.

The contract was to continue in force for forty-nine years, but New Granada could take possession of the road in twenty years after completion, upon payment of five millions of dollars; in thirty years, upon payment of four millions; or, in forty years, upon payment of two millions. Three per cent. was to be paid to New Granada upon all dividends declared. The entire work was to be completed in eight years, and a sum of a hundred and twenty thousand dollars was deposited at its commencement, as security for the fulfilment of the contract, but to be refunded, with interest, on the completion of the road within the given time. All public lands lying on the line of road necessary for the rails were to be used gratuitously by the Company, which also received a free gift of two hundred and fifty thousand acres of public land, to be selected from any part of the province of Panama. The two ports, one on the Atlantic, and the other on the Pacific, were to be free ports, and the Company had the privilege of establishing such tolls as they might think proper.

The nature of the country through which the line of road had to be carried was such as to strike the hardiest speculator with dismay. The first thirteen miles from Navy Bay was a deep swamp, covered with jungle, reeking with malaria, and abounding with wild beasts, noxious reptiles, and venomous insects. Further on, the line ran through a rugged country, over rapid rivers, and all sorts of impediments, and, after passing the summit, descended rapidly to the Pacific.

The climate, also, was sultry, almost beyond any other part of the world, and, during the wet season, the rain descended in a perfect deluge. Moreover, the resources of the country were found to be *nil*, or nearly so, and consequently everything, especially labour, had to be imported; whilst, to crown all, the ports, or rather roadsteads, at either extremity, proved to be very far from desirable termini of the railway. Despite all these obstacles, the undertaking was commenced, and, under the able superintendence of Colonel George M. Totten, successfully completed. The first blow of, perhaps, one of the boldest and grandest enterprises of modern times was struck in 1850.

The progress made was as follows:—The first 7 miles, to Gatun, were opened in December, 1851; 23 miles were completed in 1853, and 30 miles were in full operation in 1854; while the entire road was opened for traffic on the 28th January, 1855.

The total length of the road is 47 miles 3020 feet. It runs on the right or easterly bank of the Chagres, as far as Barbacoes, where it crosses the river by a bridge 625 feet in length, 18 feet in breadth, and 40 feet above the main level of the river. This bridge is of wrought iron, and is exactly halfway between Aspinwall and Panama; and it is not a little singular that the bridge thrown across the Nile between Alexandria and Cairo is also exactly halfway; in other words, both the great Isthmus transits are intersected at half their length by a large river. The Barbacoes bridge is of 6 spans, built of boiler-iron, with a top and bottom chord 2 feet in breadth and 1 inch in thickness, joined by a web of boiler-iron 9 feet in height at the centre, and 7 at the ends. The rails are laid on iron floor-girders 3 feet apart, and the whole structure is supported by 5 5 piers and 2 abutments, 26 feet wide and 8 feet in thickness, increasing in the proportion of an inch to the foot down to their foundations, which are constructed of piles and concrete.

The highest point of the line is $37\frac{3}{4}$ miles from the Atlantic, and is 263 feet above the mean level of that ocean. The maximum grade on the Atlantic slope is 1 in 90; on the Pacific descent it is rather more, viz. 1 in 88.

Of the road $23\frac{4}{5}$ miles are level and $28\frac{3}{5}$ straight, but there are some very abrupt curves. There are no less than 134 culverts, drains, and bridges of 10 feet and under, and as many as 170 bridges from 12 feet span to 625 feet span.

The line is a single one, but there are four commodious sidings,—one at Gatun, $7\frac{1}{2}$ miles from Aspinwall; one near Barbacoes, 22 miles; one at Matachin, 30 miles; and one at the summit, 37 miles. Experience has proved that there is no difficulty in maintaining the line in proper order at a reasonable expense, but, on the contrary, that it can be kept in better condition than similar works in northern latitudes, where the climate appears to have a more injurious effect than within the tropics.

Stations occur at every 4 miles. The house is the residence of the track-master, who with 10 labourers has charge of the intervening mileage. The road is kept in perfect order by these men. There are 12 track-masters and 120 labourers in the employ of the company, solely to look after the security of the line. Their wages are,—track-master, 3 dollars per diem; labourers, 60 cents. The staff of the company is not very extensive, the civil engineers with their assistants and managing clerks constituting the greatest expense. The strictest economy consistent with efficiency is practised: for example, there are excellent locomotive shops at Aspinwall, in which the engineers and stokers, when not at work on the railway, are employed; and it is said that the business done in effecting the necessary repairs for steamers calling at the Bay, almost supports the engineering staff and working locomotive expenses of the company.

A substantial telegraph is established between Aspinwall and Panama. There are 26 posts to the mile, constructed in the following manner:—A scantling, four inches square, of pitch pine, is encased in cement, moulded in a cylindrical form, tapering towards the top, and sunk 4 feet in the ground. I was assured that when once dry, these posts would last for ages. The cost of each was 5 dollars, about £1 sterling. They have the appearance of hewn stone, and are quite an ornament along the line. The total expenditure of the Panama Railway Company amounted to 7,407,553 dollars, or rather more than £1,500,000 sterling, which is nearly £32,000 per mile,—an expense, by the bye, below the average of our English lines, which is 34,638 per mile.

The outlay for the construction of this the first railway built in the tropics was, no doubt, enormous, and arose chiefly from the entire novelty of the work and the extreme paucity of labour. Men were brought to the locality in great numbers from Asia, Africa, and America; and they flocked there from almost every part of Europe, tempted by the very high rate of wages, but they died within a few months after arrival, and but a small portion ever returned home.

Very few undertakings have paid better than the Panama Railway. This is not to be wondered at, when it is remembered that the Company have a monopoly of transit, and charge most exorbitantly. For example, the passage money is £5. 4*s.* 2*d.*; children under 12 years, half-price; under 6 years, quarter-price. There is only one class, so that each passenger has to pay the same. The transit occupies about four hours, the distance is 47½ miles, and the fare, therefore, 2*s.* 2*d.* per mile, the most expensive railway travelling in the world; at the same time, the working expenditure is very moderate. The fuel, for instance, is wood, and sufficient for the whole journey is procured for 2½ dollars, or 10*s.* The charge for freight is on the same high scale as the passenger traffic. Take, for instance, live stock. Cattle, by passenger trains, owner's risk, 25 dollars each, the same exactly as a passenger. Sheep, by passenger train, owner's risk, 12½ dollars each, the same as a child under 12 years of age.

By a statement in the 'New York Times' of 23rd September, 1865, it appears that the Panama Railroad Company, after paying regular dividends of 20 per cent. per annum, has declared an extra dividend of 40 per cent, making 60 per cent. for this year, and has raised its quarterly dividend from five to six per cent., or 24 per cent. per annum.

To earn this large profit, the traffic must be enormous, and every one acquainted with Aspinwall and Panama, the terminal ports, knows that it is so; in fact, the passenger traffic alone increases at the rate of 30 per cent. per annum. The Panama Railroad is doubtless a great fact, and a very pleasant one for the shareholders; but the moral I draw from the fact is, that there is plenty of room for another transit, and the sooner one is opened the better.

The inconveniences and high charges already act as a damper to commerce and communications with the Pacific, paradoxical as thi may seem considering the rapid increase mentioned above (30 per cent. per annum); but increased facilities increase traffic, and the converse is equally true; for while Parliamentary papers for Vancouver Island are charged as letters, the mere transit of 'The Times' 4*d*., and the postage on every letter crossing by the railroad 1*s*., thousands are debarred from using so expensive a transit.

NICARAGUA.

In spite of the interesting geographical position of Nicaragua, it is to this day almost a *terra incognita.* It lies between the 11th and 15th parallels of N. latitude, and the 83rd and 88th meridians of W. longitude, and is bounded on the north by the Republic of Honduras, on the south by the Republic of Costa Rica, on the east by the Atlantic, and on the west by the Pacific. It contains, more or less, an area of 30,000 square miles, and is about the size of Portugal.

One glance at the map will suffice to show that it occupies, as nearly as possible, the central position of the New World; and as its territories afford a ready means of access between the Atlantic and Pacific Oceans, the secret of its importance to the commerce of the world is readily understood.

The climate of Nicaragua is varied: on the low coast-lands a tropical heat and very humid atmosphere prevail, but in the interior the seasons are very uniform and marked. The heavy rains on the coast are no doubt due to the dense primæval forest which clothes the soil down to the very water's edge, but which inland gives place to magnificent savanas and broad level plains.

There is a curious proof of the theory of the influence of vegetation on the rain-fall. In August, 1841, when the emancipation of the Negroes of Corn Islands, Mosquito Coast, took place, the entire soil of the islands was planted with cotton, with scarcely a tree to be seen. At that time the rainy season did not last over three months, while at the present moment, all cultivation having ceased and dense vegetation taken the place of cotton plantations, it is rare to find even a single month pass without rain; and the annual rainfall has increased 100 per cent. The seasons, as I have said before, are well marked in the interior, and divided into two, the wet and dry, or summer and winter. The rains commence in May and last until November, while the rest of the twelve months often pass without even a shower. The dry season is much cooler than the wet, as the refreshing trade-winds temper the heat during this period.

The following observations will give an idea of the atmospherical laws by which the climate is governed:—

Mean highest temperature	86°
Mean lowest temperature	71°
Average annual temperature	78°
Annual rain-fall	97·7 inches.

Rain fell in 139 days in 1863.

That the general healthiness of the country is above the tropical average is proved by the age the natives attain, and the vigorous use of their faculties they enjoy at a very advanced period of life; for instance, there were living in the town of Matagalpa during my late journey to Nicaragua no less than seventeen men all above ninety years of age, and still active. Indeed, in almost every city and town people point out with pride their very old men, a custom dating from long before the conquest.

As regards the Atlantic sea-coast, I may mention that the Moravian missionaries, all Europeans, established there sixteen years, have not lost a man, and, as far as I can ascertain, not one has been invalided.

Again, respecting the inhabitants of Greytown the same rule holds good, for during my six years' experience of the place I have not missed a single familiar face out of the small population of the town.

Many a place has been set down as sickly, simply from the rapid deaths of the disorderly and dissipated members of its resident society, and from no radical fault in the locality itself. In Nicaragua any virulent disease would soon make itself felt, for the country is very thinly inhabited. From careful calculations, based upon a very extended knowledge of the republic, I should estimate that the population does not exceed 150,000, or five to the square mile.

The scenery of Nicaragua is most beautiful, and, taking it all in all, perhaps unrivalled in the world. The Atlantic coast-line is for the most part low, and fringed with primæval forests; magnificent rivers rising in the far interior empty themselves into the Caribbean Sea, their mouths intersected by extensive lagoons, forming an interior navigation unrivalled in any part of the world I have ever visited.

Inland, towering mountains and volcanoes, extensive savanas, level plains, and beautiful lakes, dotted with the most romantic islands, meet the view on every side.

This account of the aspect of the country would not be complete without a brief summary of its manifold productions, viz. precious metals, cochineal, indigo, sarsaparilla, vanilla, india-rubber, balsams of various kinds, copal, cotton, cocoa, coffee, tobacco, hides, mahogany, cedar, live-oak, several dyewoods, pitch-pine containing large quantities of tar, lignum-vitæ, a great variety of hard woods, silk grass, tortoise-shell, etc.

Indeed, its productions are more varied and useful than in any other part of the globe of like extent, and, moreover, some of them cannot be surpassed in quality; indigo, for example, has long been accounted the best of any; cocoa was and still is unequalled,—at the time of the Spaniards it was reserved for the king's use; the coffee is excellent, the same as Costa Rican; cotton, when formerly exported, was superior to any of the New Orleans varieties: indeed, the Atlantic side of Nicaragua, commonly called the Mosquito coast, must be ranked first of all the cotton-growing countries, for not only is the soil and climate adapted to the growth of the plant, but the facilities of cheap water-carriage to the port of shipment must distance all competition, while, inasmuch as the Mosquito coast is nearer England than New Orleans, and the navigation to it is incomparably less hazardous, consequently freight and insurance must rule less, and this, I take it, is, after all, an element of primary importance in cotton supply.

The early history of America is so familiar to most people, that I shall not refer to it beyond what is necessary to illustrate my special subject.

The discovery and conquest of Nicaragua followed naturally upon the bold exploit of Vasco Nuñez de Balboa. Early in the year 1522 Gils Gonzalez de Avila sailed along its Pacific coast, and two years later we find the country overrun and subdued by Francisco Hernandez de Cordova, who founded the cities of Leon and Granada. Pascual de Andagoyer, one of the conquerors, gives us his impressions of Nicaragua at that early date, and in several particulars it is the same to this day. The Tiangues, or markets, for instance, are still held in the Plaza, or open square, and the small change is still cacao beans, the most fluctuating currency in the world. I have known forty beans equal to one real, about sixpence, and I have seen six only given in exchange for the same coin. The following is Pascual's account:—"This land is very populous and fertile, yielding supplies of maize, and many fowls of the country, and certain small dogs, which they also eat, and many deer and fish. It is a very salubrious land. The Indians were very civilized in their way of life, like those of Mexico, for they were a people who had come from that country, and they had nearly the same language. Herrera says that five languages were spoken in Nicaragua: the Charibizi, the Chototecan, being the most ancient, the Chontal, the Orotinan, and Mexican. These people went about well dressed in the Indian fashion; the women with their mantles, like those of Coriba, and another description of covering, which, descending from the head, covered the bosom and half the arms. The men covered their loins with very long cloths made of cotton, which they passed in many folds from the hips to the thighs. In the villages they wore their mantles like cloaks under the arms. They had a great quantity of cotton cloth, and they hold their markets in the public squares, where they traded. The land was poor in gold, and they traded with cacao, as in New Spain. They had many beautiful women."

Leon, which is mentioned by Pascual, exists no longer, the present city being nearly 20 miles from the old site, the ruins of which attest its former grandeur. It was abandoned from a superstitious panic by the entire population in one day, in consequence of the murder, in the Episcopal Palace, of the Bishop of Nicaragua, by the brothers Conteras, who, towards the end of the sixteenth century, attempted, and very nearly succeeded in erecting for themselves an independent commonwealth in Central America.

The history of Nicaragua consists of a continuous narrative of attempts to filibuster the country. First came the conquerors themselves; then the brothers Conteras; then that Prince of Buccaneers, Morgan, and other brethren of the Main; and lastly, General Walker, who paid the penalty of his filibustering proclivities with his life in September, 1860.

In 1821 the Central American Provinces, of which Nicaragua was one, declared their independence, and from that time have undergone various vicissitudes and revolutions. Since 1852, however, each state has declared itself sovereign and independent. Nicaragua is ruled under a Republican form of Government. The Senate and Chamber of Deputies meet once a year, and continue in session about two months, generally February and March. The constitution is modelled upon that of the United States. The laws are liberal and well administered, and the State is now in a quiet and prosperous condition. I have ridden all over it, often quite alone, and have never met with the slightest incivility; and, moreover, during my six years' intimate knowledge of the country, I have never even heard of a highway robbery or a murder. Horse-stealing and petty thefts generally composed the calendar, but as a good thrashing is by law the punishment for stealing, and the authorities are very particular that the blows are well laid on, in public, with a good stick, thieving is rather a rarity.

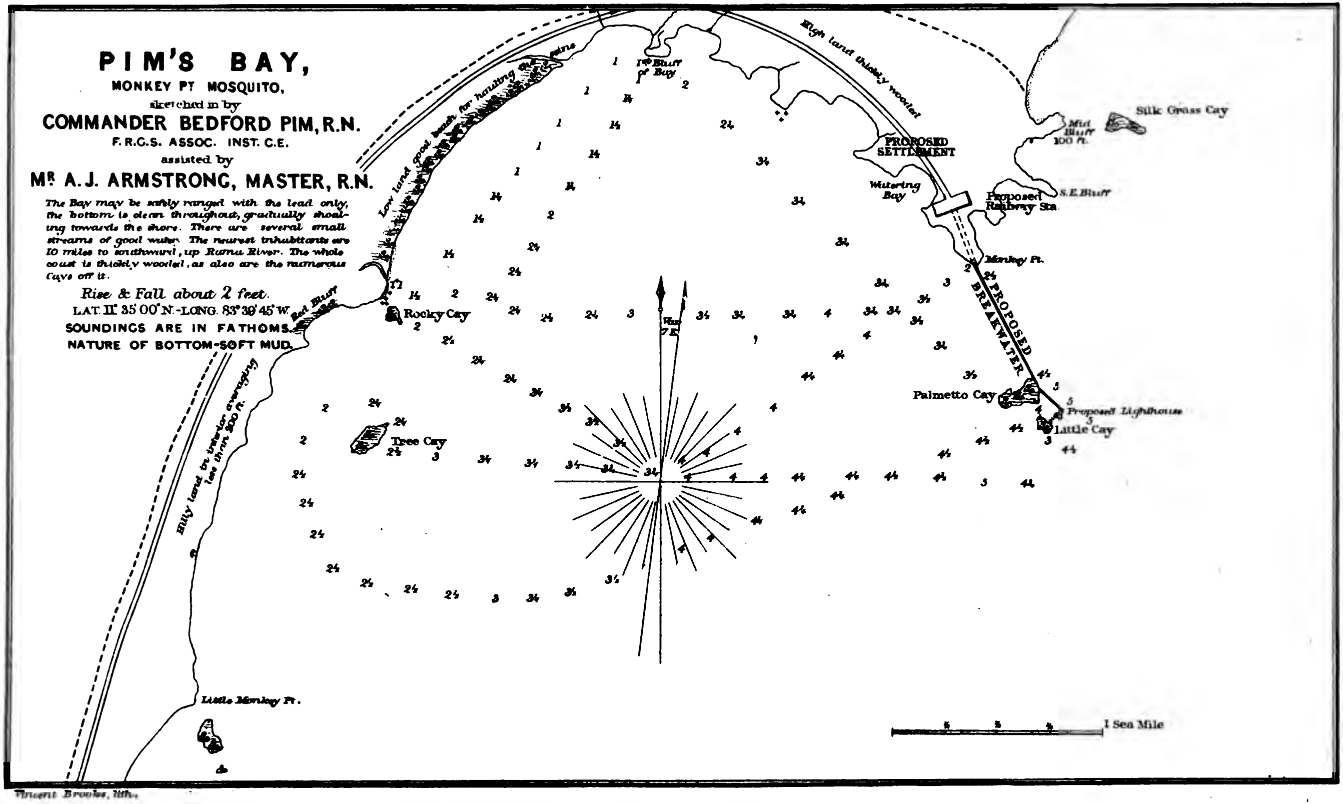
I have endeavoured, in the preceding brief sketch, to give a general idea of Nicaragua. I have laid so much stress on its importance, because it offers a transit between the Atlantic and the Pacific; an easy means of reaching the Antipodes; a stepping-stone to a wonderful increase of commerce.

This transit, in the interests of peace and the commerce of the world, on the broad basis of free trade, I am labouring to make a great highway of nations, which shall, for ever, be open to the traffic of all nations, under every circumstance, and uninfluenced by war, or rumours of war, from any quarter.

To carry these views into practical effect, the first thing necessary was to make a careful study of the aspect of the country, and then to fix upon that part best suited to transit purposes.

I accordingly gave the topography of Nicaragua the most attentive examination, and selected a line of road running as nearly as possible parallel to the transverse valley of the Nicaraguan lakes. The fact that this transverse valley had been pronounced by competent engineers easy for a canal, went a long way to prove that no serious obstacle existed to the construction of a railroad. Indeed, although it was found impracticable to raise the necessary funds to construct a canal (the pet project of the Emperor of the French when he was an exile and a prisoner), yet certain citizens of the United States opened a transit by means of stern-wheel light-draught steamers from Greytown up the river San Juan to the Lake of Nicaragua; side-wheelers to cross the lake, and waggons on the intervening 15 miles of land between the lake and the Pacific; and this rude transit, with no less than six changes, has been successfully worked; until, owing to natural causes, the silting up of the harbour of Greytown and of the river San Juan, it has been closed up. As late as March, 1865, 1500 pasengers, men, women, and children, crossed by this route,—in canoes, bongoes, any sort of craft indeed that came to hand, and at great personal hardship. The fact that no one of this large number suffered from fever is a wonderful proof of the salubrity of the climate.

Then came the grand question of ports; for, after all, the existence of good and safe termini is of the first importance to a transit. Here I was again fortunate, for upon a close examination of the



PIM'S BAY,

MONKEY PT MOSQUITO,
sketched in by
COMMANDER BEDFORD PIM, R.N.
F.R.G.S. ASSOC. INST. C.E.
assisted by
MR. A. J. ARMSTRONG, MASTER, R.N.

The Bay may be safely ranged with the lead only, the bottom is clean throughout, gradually shoaling towards the shore. There are several small streams of good water. The nearest inhabitants are 10 miles to southward, up Rama River. The whole coast is thickly wooded, as also are the numerous Cays off it.

Rise & Fall about 2 feet.

LAT. 11° 35' 00" N. - LONG. 83° 39' 45" W.

SOUNDINGS ARE IN FATHOMS.

NATURE OF BOTTOM - SOFT MUD.

Vincent Brooks, lith.

coast, about 30 miles north of Greytown, I found the neglected and imperfectly known bay enclosed within Monkey Point, the very thing I was in search of, and which has since been officially named after myself, "Pim's Bay." On the Pacific side there was no necessity for any examination, inasmuch as the port of Realejo, which had been surveyed by order of the British Admiralty some years before, was everything that could be desired in the shape of a harbour. Thus, with a good port on each side of the country, and the intervening land in all probability offering no serious obstacle to the construction of a railway, I was, from the very inception of the idea, encouraged to proceed.

In 1860, I made my first journey into the interior for the double purpose of improving my acquaintance with the topography and of informing our Minister plenipotentiary of my discoveries and projected transit. But I soon found that it was not considered expedient, politically, to endorse my opinion as to the necessity of a new route. I gained nothing, therefore, by my journey, except an improved knowledge of the interior of Nicaragua, more than sufficient to convince me that I was on the right track.

After this journey, circumstances prevented the active prosecution of my plans until my return to England from foreign service, in 1861, when I determined to devote myself to the development of my transit project.

In the first place, I threw together all the information I had been enabled to collect, embodying my views and experience in a book called 'The Gate of the Pacific;' and thus introduced the subject to the public. His Majesty the Emperor of the French accorded me a flattering reception, and encouraged me to persevere. I found him thoroughly well informed upon even the most minute detail concerning Nicaragua, and the cross-examination I underwent was no trifle. His Majesty did not content himself with words, but aided me in the manner I desired, namely, by putting me in communication with the great capitalists of France, through M. Émile Perreire, to whom the Duke de Bassano was ordered to communicate his Majesty's wishes.

In March, 1863, I went to Nicaragua, accompanied by a staff of civil engineers, to make a scientific examination of the nature of the ountry. A road was cut through the dense primeval forests, fully onfirming the entire practicability of the projected route; but, lthough no physical difficulty presented itself, there was still an bundance of obstacles of a political nature.

I found Nicaragua at war with San Salvador, and, moreover, in revolution; so that it was quite out of the question attempting to obtain the necessary concession from the Government in the then state of the country.

Finding that nothing further was to be done in Nicaragua until the meeting of Congress in the following January, I returned with my expedition to England. A full account of our operations was read before the Geographical and Mathematical sections of the British Association at Newcastle, in August of that year.

In the following October I again started for Nicaragua, this time quite alone. I succeeded in making very extensive explorations of the country; and, when Congress met in February, 1864, a bill was passed through both Chambers, and approved by the Government, granting me a concession to build the railroad over the route I proposed.

In June, 1864, I was at home again, but soon found that the concession must be improved before a company could be formed. This involved another Nicaraguan journey, upon which I started in November of the same year.

In the meantime, however, and as a powerful means of drawing attention to the country, I brought the mineral riches of the Chontales district under the notice of friends, the result of which was the formation of a company, with the object of exploring the auriferous and argentiferous veins of the district.

I was accompanied in this my fourth journey [1864–5] by a mining engineer of ability and a well-known artist. Upon my arrival in Nicaragua, I caused a new road to be cut into the forest, and the nature of the country to be minutely examined; altogether, this expedition, from which I returned in May, 1865, has proved by far the most important of all.

1st. In spite of some opposition in passing the new bill through Congress, my concession has been greatly improved. The term is ninety-nine years. One-and-a-third millions of acres of land are ceded gratuitously, all of which land is situated in the three rich mineral districts of Chontales, Matagalpa, and Segovia, nearly half a million acres in each. Besides this, there are extensive land grants on each side of the line in alternate squares, one for the Government, the next for the railroad company, and so on all through the greater part of the line. Both terminal ports are free ports; and it is especially stipulated that the Government shall have no sort of control over the working and management of the transit.

2nd. An examination of the gold and silver district of Chontales proved beyond dispute its immense value, and no doubt the Nicaraguan gold and silver fields are destined to a prominent place in supplying the precious metals to the world. At present, the country surrounding the mines is covered with dense forest, so that roads have to be cut to the veins which the Indians discover, before they can be worked. This is one reason why more energetic steps for the development of the mines have not been taken by the natives. The lodes are large and strong, some of them as much as forty feet in breadth. The quartz at surface is friable, but becomes more compact and produces more visible gold as the depth increases. The deepest mine yet worked is 225 feet below the summit of the hill. From one sample in which gold was *not* visible we obtained 238 oz. 10 dwts. of gold, and 28 oz. 12 grs. of silver per ton; and from 4 lbs. 2 oz. of ore, by simply washing and amalgamating, two large pieces of gold were produced, equal to 300 oz. to the ton. When it is remembered that the St. John del Rey mines of Brazil only average ⅝ oz. of gold per ton, and yet pay magnificent dividends, it is evident that the Nicaraguan mines hold out strong hopes for the future.

3rd. A closer examination of the proposed line between the Atlantic and the Lake of Nicaragua disclosed several important facts, such as an easier grade than found in 1863. Large groves of india-rubber trees, an abundance of cedar and mahogany, besides other valuable products, abound over the entire line; and I hear by late advices from Nicaragua that some people have been prospecting on my new road, and found, in the language of miners, a broad, strong vein of gold right across it.

I have now only to point out some of the benefits which will result from the opening of the route through Nicaragua, and which, by the bye, I ought to mention, is guaranteed in all its entirety by solemn treaty, both on the part of England and France, and in due course will be, I hope, by the United States.

In the first place, a real road will be opened to California and British Columbia, by which the distance will be shortened six days, while the cost of the journey will be lessened fifty per cent., and thus practically open the way for a steady flow of emigration, the only thing needed to make North-western America eminently prosperous. Japan, also, which is on a continuation of the great circle passing through Vancouver, will be no longer in a position to refuse its riches to the commerce of the world; whilst even distant China will be brought nearer than heretofore.

Polynesia will rise into importance, and the broad Pacific, that sea of seas for the steam-ship, will at last find its sublime solitudes ploughed by the keels of all nations, and thus bring it into as much usefulness as its sister ocean—the Atlantic.

New Zealand and Eastern Australia, however, will reap the greatest benefit by the opening of the new route; the former will be fifteen days nearer the great marts of commerce, London and New York, and even the latter will enjoy a clear gain of some days, to say nothing of the comfort and security of making the voyage on an ocean seldom ruffled by storms, and enjoying an exceptionally fine climate.

Last, though not least, the immediate effect of constructing a railroad through Nicaragua will be to throw that magnificent country into the arms of civilization and progress, to make its vast riches of some use in the world, to develope its capabilities for the growth of cotton, in short, to place it in the proud position it is well qualified to fill.

There is no country superior to Nicaragua for climate; her forests, her inland navigation, is unsurpassed. A glance at the map of the world will show that she occupies a geographical centre. Open up a means of transit, and then a ceaseless stream of commerce and civilization must ever flow into and across her splendid territory.

I have no doubt that the New World Isthmus is destined to play a great part in the future. That this may be accomplished in the interests of mankind, I have laboured hard for many years of my life. It is of vast importance to open it freely to all comers.

One word in conclusion:—The true principle of constructing a railway in a new country is to build it with economy, and to connect the shares with land-warrants of the territory through which the Line passes. In the case of the "International Atlantic and Pacific Junction Railway" this plan will be adopted to the letter; and, considering that it is a world's highway, it is difficult to estimate the profit which must result on this most desirable investment.

ENGINEER'S REPORT AND ESTIMATE.

4, Westminster Chambers, Victoria Street, S.W.
10th September, 1866.

Captain Bedford Pim, R.N., etc. etc.,
United Service Club, S.W.

Dear Sir,

I have the honour herewith to lay before you a summary of my views relative to what I consider to be the most feasible and judicious method of constructing your International Atlantic and Pacific Junction Railway through Nicaragua.

The necessity for a new transit has been gone into so fully and ably by you, that it would be superfluous for me to say anything on that head; I will therefore principally confine myself to an explanation of the means by which I propose to carry out the necessary works for the same.

The route for which you have obtained a concession has such obvious advantages attached to it over any other proposed, that it will be advisable, in the first instance, to point out some of the most apparent of them.

One of the great difficulties to be overcome by all projectors of inter-oceanic communications across Central America, is the want of a good port as terminus on the Atlantic side. The harbours on its coast are exposed to two great dangers:—1stly, the "Northers," which blow with terrific violence, and are sure to deal destruction in any port unsheltered from their attacks; and, 2ndly, the consequences attending on the immense amount of alluvial deposits brought down by the rivers from the interior.

Aspinwall (or Colon), the terminus of the Panama Railway, is exposed to the first of these dangers; and it is not long since the 'Avon,' one of the large steamers of the West India Royal Mail Company, unable to escape to sea during one of these hurricanes, was completely destroyed inside the port.

Greytown is exposed to the second evil, viz. silting up; and the River San Juan is doing this so effectually, that it is no longer a harbour at all, except for the smallest class of vessels.

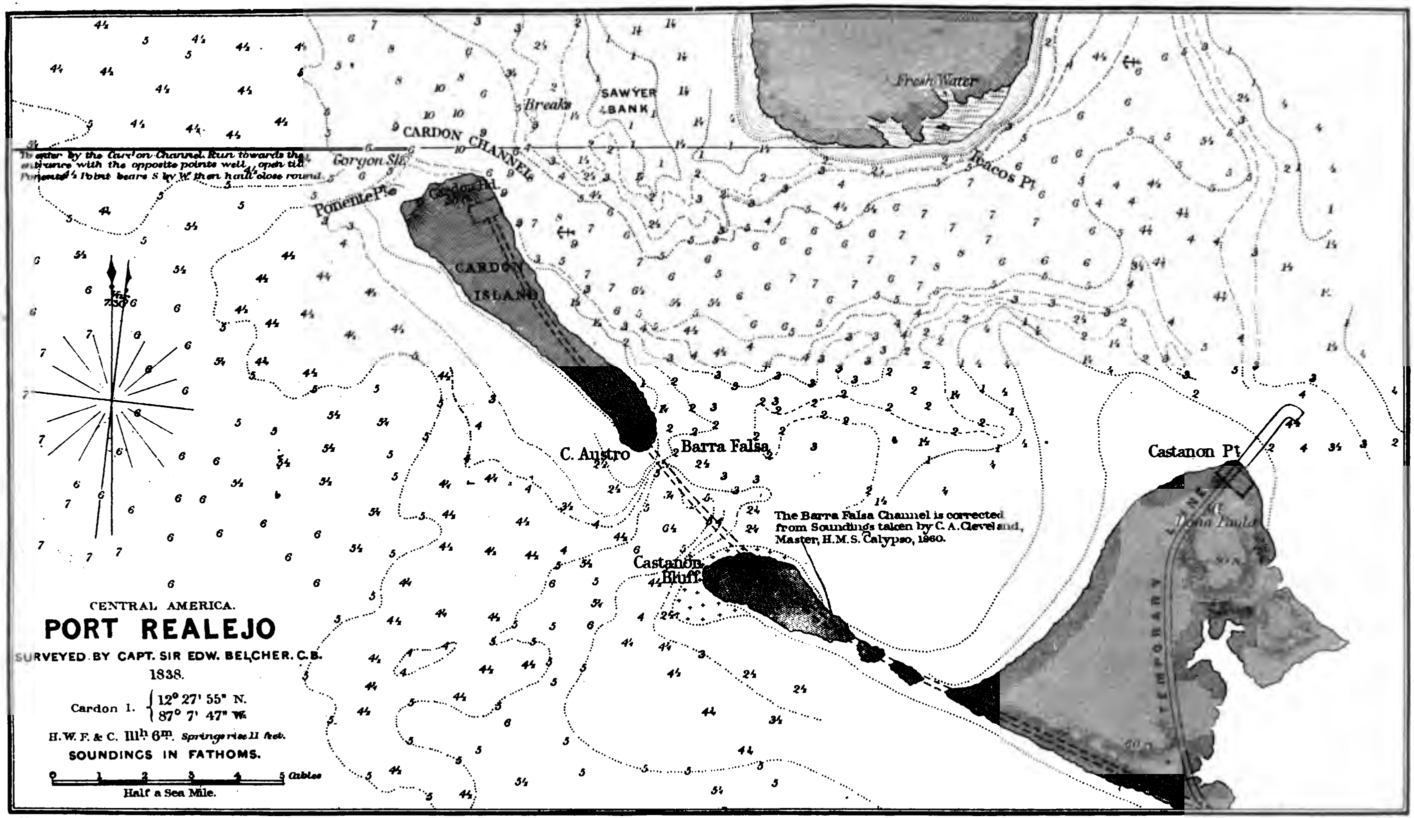
No other suitable port exists on the coast worthy of a moment's notice, with the exception of Pim's Bay, which seems to have been designed by nature for the required terminus. This bay has an inside area of over 5,000 acres; and for the greater portion of this the soundings range from twenty to twenty-four feet at low water. Rise and fall of tide being only two feet, with a bottom of soft mud devoid of rocks. Pim's Bay, as will be seen on consulting the map, opens to the south, and, even at present, offers perfect immunity from the dangers of the "Northers." With a breakwater from the mainland to Palmetto and Little Cay, the surface of the *entire* bay will be unruffled at all times. This harbour is altogether free from the second danger of silting up, no streams of any magnitude emptying themselves into it.

On the Pacific side, an equally good port (Realejo) has been obtained.

The interlying tract of country between these two ports is the richest in Central America. It affords minerals, such as gold, silver, plumbago, etc., in vast quantities. Among its natural vegetable productions are forests of india-rubber, mahogany, cedar, and other valuable trees. Vanilla, sarsaparilla, cacao, sugar-cane, etc., abound. For the growth of cotton, if encouraged, it could not be surpassed. Many fine towns are situated in it, whose inhabitants, like all Spaniards, will not walk, and who look upon the proposed railway as the greatest boon that could be given them.

Add to this, the advantage derived through the position of the Lake of Nicaragua, both as a means for shortening the Line, and bringing to it the traffic of the country, without the expense of constructing roads for that purpose;—the increasing tide of immigration flowing to the gold-fields of the interior, which the proposed Line alone could properly accommodate;—the immense value of the concession you have obtained from the Nicaraguan Government: and I think it will be patent to all, without going further into detail, that your projected Railway, in addition to its through traffic, unites in its favour to the greatest degree all the local advantages to be obtained in Central America.

It is a matter of absolute necessity that this undertaking, like al similar ones in new and undeveloped countries, should be constructed in as economical a manner as possible consistent with the probabl requirements of the traffic. If the main formation of the Line i



To enter by the Cardon Channel. Run towards the entrance with the opposite points well open till Ponente's Point bears S by W. then haul close round.

The Barra Falsa Channel is corrected from Soundings taken by C. A. Cleveland, Master, H.M.S. Calypso, 1860.

CENTRAL AMERICA.

PORT REALEJO

SURVEYED BY CAPT. SIR EDW. BELCHER. C.B.
1838.

Cardon I. $\left\{ \begin{array}{l} 12^\circ\ 27'\ 55''\ \text{N.} \\ 87^\circ\ 7'\ 47''\ \text{W.} \end{array} \right.$

H. W. F. & C. III^{h} 6^{m}. *Spring rise 11 feet.*

SOUNDINGS IN FATHOMS.

0 1 2 3 4 5 *Cables*
Half a Sea Mile.

Vincent Brooks, Lith.

made well and soundly in the first instance, it is afterwards extremely easy to increase, out of surplus profits, the facilities for carrying,—a course which I hold to be more in accordance with the wishes of shareholders and the dictates of sound judgment, than that of constructing an expensive line at first, and waiting for the development of the country to produce dividends.

In the present instance we have everything in our favour to aid us in effecting this. From practical experience in the country we are largely cognizant of its capabilities and requirements. Material, in the shape of the very best sleepers and ballast, is plentiful over the whole Line. The population is altogether friendly to us.

Labour of first-rate quality, I know, with judicious management, can be largely obtained in the country; and importation, if required at all, will have to be carried out only so far as to show the natives that we are not dependent on them, and thus keep down the present low rate of prices. On the Atlantic side especially, a larger population of Caribs and Mosquito Indians, inured to the climate, industrious and docile workmen, are at our disposal, requiring only skilled European supervision to be able to carry out every portion of the cheap and simple Line I propose.

Last, and not least, we have navigable rivers, running parallel with the Line for a great portion of it, with the feeding streams supplying an abundance of valuable water-power.

I will now describe the means of construction I propose to adopt. For the greater part of its length the Line traverses a dense virgin forest; in cutting the track through which, I would have the trees felled across the road, trimmed off, and rolled together, so as to form what is called in the United States a "corduroy" road. On the road thus prepared, I would lay down a single line of light rails (say 48lbs. per yard run), with a 5′ 6″ gauge, dog them to every alternate tree, and secure the joints with fish-plates; thus forming, in the cheapest and easiest manner, a thoroughly firm road, with the pressure on the rails distributed, through the medium of the trees, over the largest possible area.

The streams to be crossed are nearly all very narrow, and would be spanned by timber bridges, in the construction of which the natives are particularly skilful, and which would cost little, from the abundance of good wood, impervious to the attacks of worms, obtainable on the Line.

I will divide the works to be carried out into the following ections :—

No. 1.—The breakwater from Monkey Point to the outlying islands, a distance of 1100 yards. Good stone abounds in the immediate vicinity, and could, after quarrying, be tipped in over the proposed site, allowing it to assume its own slope. Should it be deemed expedient to form a communication with these islands, the necessary superstructure could be built afterwards.

No. 2.—Thirteen miles length of railway;—from Monkey Point, the proposed terminus, to the mouth of the Ramah River. This would be laid along the hard level beach, making a long sweep in its course round the coast-line.

No. 3.—Twelve miles length of railway;—from the mouth of the Ramah, keeping on its north bank to the point selected for crossing that river. This section need not be touched at first, as the Ramah is navigable up to this point, and steamers could be used both to carry up material; and also passengers, when the next section to the Lake of Nicaragua is completed. To avoid breaking bulk, rails can be fixed on the decks, and the cars transported up and down the river.

No. 4.—An iron-girder bridge, about 100 feet span, would now be required to cross the stream. This could be easily brought up by water. The line of railway would then be continued to a point a little south of San Miguelito, a further distance of 55 miles.

On arriving here, if deemed desirable, a perfect communication between the two oceans could be opened by means of the Central American Transit Company's route, from Virgin Bay, on the Lake, to San Juan del Sur, on the Pacific, as a continuation of your Line.

No. 5.—Lake steamers will be required to effect the junction between San Miguelito and Granada, the starting-point for the remaining section of the Line. There is ample depth of water in the Lake, and the navigation is easy and safe. The distance across is 85 miles.

No. 6.—One hundred miles length of railway;—commencing at Granada, thence to Managua, deviating slightly to the west to avoid the only range of hills on the whole section, skirting Leon, and ending at Port Realejo, the Pacific terminus. The country passed over is almost level, with scarcely a stream intersecting it.

The time required to accomplish the entire journey would be as follows:—

Monkey Point to San Miguelito, rail	6¾ hours.
San Miguelito to Granada, steamer	8 ,,
Granada to Port Realejo, rail	8½ ,,
Total	23¼ hours.

In submitting an estimate for the cost of the proposed Line, it must be borne in mind that many circumstances may affect the prices therein detailed.

If, however, judicious management is exercised in acquiring and retaining native labour, and that labour is turned to the greatest advantage, I feel satisfied that the estimate of cost which is given below, and which I have gone into with the utmost possible accuracy, both on the basis of my own personal experience in the country, and that of others largely conversant with its capabilities, will be amply sufficient to carry out the works I have described in a thoroughly efficient manner.

ESTIMATE OF COST.

PERMANENT WAY.

tns.	cwt.	qrs.	lbs.	For One Mile.	£.	s.	d.
75	8	2	8	Iron Rails (48lbs. per yard lin.), including freight and all charges, @ £9 .	678	17	1
5	0	2	8	Fish Plates (16lbs. per pair), 704 pairs, including do. do., @ £15 . . .	75	8	7
0	17	0	0	Bolts, nuts, and washers, for fish plates, including do. do. @ £18 . . .	15	6	0
3	10	0	0	Dogs, including do. do. @ £15 . .	52	10	0
				Per Mile . .	822	1	8

GENERAL ESTIMATE.

180 miles of Railway (inclusive of Sidings).	£.	s.	d.
Permanent way, @ per mile £822. 1*s*. 8*d*. . . .	147,975	0	0
Earthwork	95,040	0	0
Cutting trees and forming road, @ per mile £264 .	47,520	0	0
Bridges	45,000	0	0
Purchase of land, @ per mile £100	18,000	0	0
Engineering, @ per mile £200	36,000	0	0
Telegraph, with Branches, @ per mile £35 . . .	9,800	0	0
2 River steamers, @ £5,000	10,000	0	0
	£409,335	0	0

This, even on the *entire* capital of £1,000,000, will give a dividend of over 20 per cent. per annum.

In conclusion, I have to observe:—

That,—the above statement is based upon what has been *already* accomplished in Central America under peculiarly adverse circumstances, from all of which the projected Line will be exempt;

That,—the estimate of returns has been calculated upon the basis of *only* one-half the business (exclusive of passenger traffic) performed by the Panama Line, while the passenger traffic has been taken as the same which used the Nicaraguan transit ten years ago; and,

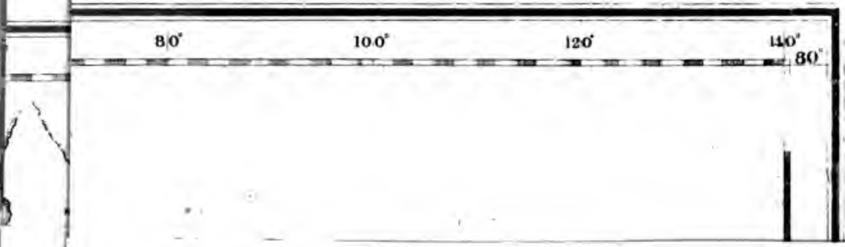
That,—the Panama Railway Company declared a dividend for last year of 24 per cent., and a bonus of 40 per cent. in addition, on their paid-up Capital of £1,600,000,—more than double our proposed expenditure; from all of which facts it is self-evident that this undertaking holds out to its shareholders a certainty of very large returns.

I am, dear Sir,

Yours very faithfully,

JOHN COLLINSON, C.E.

J. E. TAYLOR AND CO., PRINTERS, LITTLE QUEEN STREET, HOLBORN.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